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TWO CASES OF OPERATION FOR PYLORIC STENOSIS.¹

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IT is not my intention to review or compare the different operations which have been devised for the relief of pyloric stenosis. I desire merely to present the results of my experience with the most recent of these operations. I refer to that devised by Professor Loreta, of Bologna, namely, digital divulsion of the pylorus. This operation is intended to take the place of excision of the pylorus, and is, of course, applicable only to cases where the stenosis is due to cicatrization or chronic thickening of a non-malignant character. That such cases exist has been abundantly proven, and the records of pylorotomy, duodenostomy, and gastro-enterostomy all contain cases of this comparatively simple nature.

The operation of digital divulsion was first performed by Loreta on September 14, 1882, and with success. The patient suffered from dilatation of the stomach due to stenosis of the pylorus. The stenosis was believed to be due to the cicatrization of an old ulcer. (I derive my information on many points

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referred to in this paper from a translation of Loreta's article by Dr. Ancona, which is to be found in the *Arch. Gén. de Méd.* for September of this year, and from an interesting article on the same topic which may be found in the *British Medical Journal* for February 21, of this year. The latter is by Mr. Holmes. And in the *American Journal of the Medical Sciences* for April, 1885, is an article by Professor Randolph Winslow, in which the whole subject of pyloric stenosis is very carefully dealt with.)

The method of operating may be briefly described thus: Incision of the abdominal wall to the extent of about five inches on the right side, close to and parallel with the free border of the ribs. Opening of the stomach by a wound three inches long very near the pylorus, and about midway between the two curvatures. The introduction of one index finger through the pylorus, then the introduction of the other index finger, and finally the gradual forcible dilatation of the orifice to the extent of about three inches. Then immediate closure of the stomach and abdominal wounds. The probable immunity from hæmorrhage, the short duration of the operation, and the excellent results which are reported as having followed the practice, would certainly seem strongly to recommend its adoption in suitable cases. I find it impossible to present anything like an accurate statement of the results of all the cases thus far operated upon by this method.

Winslow, in the article already referred to, summarizes the number of operations up to April of this year as six. Four of these were done by Loreta and two others by different Italian surgeons. Of these six cases, two died, but no mention is made of autopsy. The others were all successful. In Ancona's article the statement is made that Loreta claims to have performed the operation twenty-two times and *always* with success. Also that five other Italian surgeons have done the same operation successfully. It is difficult to reconcile these different statements, and I am not able to verify them, as many of the cases have not been published. It is doubtless true, however, that so far the operation of digital dilatation of the pylorus has been very successful, and the mortality low as compared with any other operation having the same object in view.

CASE I.—Marie B. Propes, æt. 39, married, Virginian, was first seen by me in the early part of the present year. She had then been for some months under the care of Dr. F. P. Kinnicutt, at St. Luke's Hospital, who had carefully noted her symptoms and diagnosticated dilatation of the stomach due to stenosis of the pyloric orifice.

The patient gave the following history: From 20 years of age up to a year ago she suffered from attacks of what she called "bilious colic." These attacks occurred every few weeks, and were characterized by intense pain in the epigastrium extending to the back and by violent vomiting without blood. About one year ago she began to have frequent attacks of vomiting, these occurring sometimes twice a day, sometimes only once in two or three days. Nearly all food was vomited, and intense burning pain was felt in the epigastrium with continual thirst. For some five months the patient had been confined to bed, and had become very weak and emaciated. For seven or eight years before this period her weight had averaged two hundred pounds. Half of this weight had been lost within one year. Flatulence, eructations of gas, and obstinate constipation had been prominent symptoms for many months. No pulmonary or cardiac symptoms existed.

On admission to the Hospital on February 4, 1885, the patient weighed less than one hundred pounds. The localized distention of the abdomen extended from just below the ensiform cartilage to a point three inches below the umbilicus, and to a point three inches to the left of the umbilicus, and two inches to the right. Over the whole of this region was marked tympanitic resonance on percussion. After emptying the stomach with a rubber tube, a small movable tumor, about the size of an almond, could be felt on deep pressure, one inch to the right of the median line, and two and one-fourth inches above the umbilicus. The patient was put upon a diet of peptonized milk and beef peptonoids, and the stomach was washed out daily. On each occasion the washing was kept up until the fluid returned was perfectly clear. In spite of this lavage, vomiting occurred almost daily more than a month, and when a little rice had been added to the diet, particles of rice could be found in the washing five days after such a meal. Nevertheless, under this treatment the vomiting gradually subsided and the patient's weight steadily increased. The experiment of discontinuing the washing was then tried, but pain and vomiting almost immediately returned.

In this case, then, there was no history of ulceration. The enormous dilatation of the stomach was easily demonstrated by filling the organ with water, and then emptying it. The existence of obstruction at the pyloric orifice was also shown by the return of undigested food many

days after it had been swallowed, and finally a distinct tumor could be felt at the exit of the pylorus. This tumor was believed not to be malignant from the facts that it did not increase in size during the months of observation, that there was no true cachexia, and that the patient increased in weight many pounds while under treatment. No doubt she could have been kept alive with careful treatment, including daily washings of the stomach, for an indefinite period. She was anxious, however, to leave the hospital; was too nervous to manipulate the stomach tube herself; and desired some radical operation.

I desire to state here that the whole of the medical treatment of this patient had been conducted by Dr. Kinnicutt, under whose care the patient was, and who, after consultation, requested me to operate upon the case.

Believing the case to be similar to those reported by Professor Loreta, and in which he obtained such signal success by forcible dilatation of the pyloric orifice, I determined to attempt the same procedure.

On July 3, the patient was put upon a diet of peptonized milk only, to prepare the stomach for operation. On July 6, the day of the operation, the stomach was thoroughly washed out with borax solution at 10 A. M., and again at noon. At 2:15 p. m., irrigation was practised with a solution of salicylic acid 1 part, boric acid 4 parts, and water 1500 parts. Before the second washing the fluid was found to be distinctly acid, and to contain some white material in suspension, which, after settling, left the fluid comparatively clear. The sediment consisted of oil globules, casein, and oval and polygonal epithelial cells. Ether was given at 2:30 p. m. on July 6, 1885, and the operation was conducted as follows: with the immediate assistance of my colleague Dr. Abbe, and in the presence of a number of surgeons and physicians. The surface of the abdomen was thoroughly cleansed. I made an incision about five inches long, from a point one inch below and one and a half inches to the left of the ensiform cartilage, downward to the right, parallel with the border of the ribs. All the tissues down to the peritoneum were divided as rapidly as possible, and all vessels tied. The peritoneum was then incised throughout the whole length of the wound, and the pyloric end of the stomach readily found and drawn out through the wound. No adhesions existed between the pylorus and the liver or pancreas. The small tumor already described was felt at once, and was evidently the thickened wall of the pyloric orifice. The anterior wall of the stomach, nearer the lesser curvature and just to the left of the pylorus, was clasped by two thumb forceps, the blades of which were covered with flannel, and incised to the extent of three inches.

The pyloric orifice was easily found, but it was so contracted that I could not, even when using as much force as I dared, pass the first phalanx of my finger through it. It felt very much like the firm os of a normal uterus. For this emergency I had ready a rectal dilator, which seemed to be well suited for a preliminary stretching, having perfectly smooth, rounded blades. This was easily passed through the pylorus, but so great was the tenacity of the hypertrophied wall that it was only after repeated stretchings with this instrument that I was able to get one finger through. I then passed in the index finger of the other hand, and, by forcibly separating the two for some time, stretched the opening to a long diameter of about three inches. It was then perfectly easy, on looking through the wound in the stomach, to inspect the dilated pylorus. A short tear in the mucous membrane was recognized, and a very little dark blood noticed, but no bleeding vessel. The mucous membrane of the stomach was then sewed with a fine silk, continuous suture, a straight, round needle being used. No bleeding worthy of notice had occurred in making the incision in the stomach wall. The serous coat was united by twelve interrupted catgut sutures introduced after Lembert's method. The peritoneum of the abdominal wound was then sewed with a continuous catgut suture, and deep and superficial catgut sutures were used to close the incision of muscles and skin. Three silver wire supporting sutures, with lead clamps, were used to give additional strength. An antiseptic dressing was applied over all. The operation, from the first incision to the complete closure of the external wound, lasted one hour and eighteen minutes.

The patient bore the operation quite well, and at 6 p. m. her pulse was fairly good. Still the evidences of shock were very noticeable, and from this time on both pulse and respiration rapidly failed. She died six hours after the close of the operation, although every effort was made by the members of the house staff and myself to sustain life.

An autopsy was held in my presence the next day. Excepting the stomach, the various organs were found to be in a healthy condition; the wound in the stomach was found tightly closed, so that on distending the stomach with water not a drop escaped. On opening the stomach it was found to contain some ten or twelve ounces of fluid blood. The mucous membrane of the stomach itself was deeply stained with blood; but no lesion other than the operation wound was to be discovered. The pyloric orifice was widely dilated so as easily to admit three fingers. In the mucous membrane of the pylorus on the posterior surface was a recent longitudinal laceration, about an inch long. This laceration extended through the mucous and submucous coats; otherwise the mucous membrane was normal, and no trace of

old or recent ulceration could be found. Entirely surrounding the pylorus was a thickening of firm fibrous or fibrous and muscular tissue, which had doubtless caused the stenosis, and which had formed the small tumor previously described. The duodenum was found to contain a large quantity of blood, and many ounces of blood were found in the small intestine. The peritoneum, except where cut in the course of the operation, was normal. No adhesions existed at any point.

The behavior of the patient after the operation, together with the result of the autopsy, made it very clear that the patient had died of hæmorrhage, the blood coming from a vessel involved in the tear of mucous membrane found in the pylorus.

CASE II.—Susan Joyce, æt. 52, widow, Irish. The patient was admitted for the first time to St. Luke's Hospital on December 18, 1883. She then gave the following history: from 14 to 19 years of age she had occasional hæmatemesis. At the age of 19, after a severe exertion, she vomited a large quantity of blood during two days. Twenty years ago the patient vomited black grumous material nearly every day for a year, and always had severe pain in the epigastrium after eating. In the early part of 1881 she vomited a large quantity of blood. She was admitted to the hospital much emaciated, complaining of severe abdominal pain, which was much increased after eating, and which extended to the back and right shoulder. The stomach was found to extend to a point four inches below the umbilicus. After a short stay in the hospital the patient was discharged, to be readmitted on April 9, 1885. Since leaving the hospital she states that she has been living upon milk and stimulants, with a little fish and eggs. She had continued to vomit daily. Usually the vomit had been of a dark green color, sometimes mixed with a little bright blood. Constipation had been extreme, no stool occurring without a cathartic. She had been confined to bed for the last six weeks, and had lost flesh and strength rapidly. The patient was found to be emaciated, anæmic, complaining much of thirst and constipation. Tongue coated, and urine scanty. Slight dulness was found at the right apex, and the patient had a cough and occasional fever and night sweats. The stomach was found to be much dilated, occupying the left umbilical, lumbar, and hypogastric regions, extending two inches below the level of the anterior superior iliac spines. Percussion over this area was resonant, with marked succussion sound. A distinct tumor, about one inch long and one-half inch broad, was felt in the epigastric region two and a half inches above the umbilicus in the median line. This tumor was not movable, and was firm and resistant. With the exception of the apex of the right lung the other organs were normal. The patient was put upon a diet of

peptonized milk and beef peptonoids. Her weight at this time was eighty-seven pounds, certainly from thirty to forty pounds less than her normal weight. On April 8 daily lavage of the stomach was begun, the solution used being one of borax, twenty grains to the pint. Under this treatment the patient's weight increased to ninety-nine pounds at the end of June. At this date the capacity of the stomach was 115 ounces.

This patient also had been under the care of Dr. F. P. Kinnicutt, in the medical wards at St. Luke's Hospital, for nearly three months. During that time I examined her, with Dr. Kinnicutt, several times, and we agreed that, doubtless, the original cause of her troubles was ulcer of the stomach, probably situated at or near the pyloric orifice, as indicated by the presence of the small tumor found at that point. It seemed probable, too, that this ulcer had healed, or had become nearly cicatrized, from the absence of hæmatemesis during a long period. The tumor was not believed to be malignant, as it did not increase in size, and as the patient did not present any cachexia, and increased markedly in weight under treatment by lavage. Her case was not a promising one, but there was no reason to believe that her life could be prolonged without surgical assistance, unless she remained a permanent resident of the hospital. I determined, therefore, to make an exploratory operation, and, if possible, relieve the stenosis.

On June 20, the patient's diet was limited to pancreatized milk only, to prepare the stomach for operation. On July 6, the day of operation, the stomach was washed out at 10 a. m., and again at 12:30 p. m. The fluid removed before the second washing was decidedly acid, containing much whitish material in suspension, which did not completely separate. Under the microscope the sediment was found to consist of oil globules, coagulated casein, granular nucleated epithelium, and some mucus.

At 3:30 p. m. the stomach was again washed with the borosalicylic acid solution. The patient was etherized at 4:30 p. m. I had the kind assistance of my colleague, Dr. Robert Abbe, and, during the operation, all possible antiseptic precautions were used. The abdominal wall was incised in precisely the same manner as in the case first reported. All bleeding was controlled, and then the peritoneum was opened as before. The stomach was easily seized, but I found considerable difficulty in locating the pylorus. It was at last made out to be directed upward and somewhat to the left, its ordinary position being occupied by the dilated pyloric end. The stomach wall was then incised to the extent of two and a half inches, the incision being

near the lesser curvature, and close to the apparently thickened pylorus. On opening the stomach an old apparently healed ulcer was felt and seen directly opposite the incision. This ulcer was about one inch in diameter, and its largely thickened edge formed the tumor which had been felt before the operation. The base of this ulcer was firmly adherent to the pancreas behind, and the contraction of cicatrization had given the stomach an hour-glass form. Even then it was difficult to find the pyloric orifice. After a search of some minutes I found it at the upper border of the ulcer, close to the latter, but not involved in it, and directed upward. The posterior edge of the pylorus had been so firmly drawn by the cicatrization of the ulcer that although it was easy, on lifting the anterior edge, to pass the finger through it, yet when the anterior edge was not so lifted, the orifice was completely closed. Had the patient's general condition warranted it, the operation of gastro-enterostomy would, I think, have been the better one; but, on account of her age and general feebleness, I did not think it wise to prolong the operation. I thought that by a thorough stretching of the pylorus I could counteract the stenosis produced by the cicatrized ulcer. When the two index fingers were introduced, the pylorus yielded very readily without tearing, so as to leave the exit from the stomach very free. The two fingers were separated during the stretching about three inches. I then at once sewed the mucous membrane of the stomach with a continuous fine silk suture, using a fine, round needle. The serous surfaces were united with a continuous catgut suture after Lembert's method. The abdominal wound was treated as in the first case, and an antiseptic dressing applied.

The time occupied in this operation, from the commencement of the first incision to its complete closure, was one hour and three minutes. The patient rallied very well from the effects of the operation. She slept comfortably nearly all night, receiving small quantities of brandy and ice, and two small hypodermic injections of morphine. But at the end of twenty-four hours her kidneys had excreted only twelve ounces of urine, which was found to contain two per cent. of albumen. Before the operation the urine had been normal, though scanty. From this time on the kidneys ceased to act, and the patient became gradually weaker, and respiration and heart action failed rapidly. She died thirty and one-half hours after the operation, the cause of death being apparently suppression of urine.

At the post mortem examination, which was made the next day, the following lesions were discovered: The left kidney was normal in size; the capsule was adherent at different points; a few small cysts were found in the cortex; the cortex was thin, and the whole organ

congested and fatty ; the right kidney was in similar condition, and an infarction one-fourth of an inch in diameter existed in it ; the upper part of the right lung displayed the lesions of advanced chronic phthisis ; the lower parts of both lungs were congested and œdematous ; recent peritoneal adhesions existed in the immediate neighborhood of the abdominal wound ; no escape of fluid from the stomach had occurred, and the wound in the stomach was tightly closed ; the mucous membrane of the stomach bore plain evidences of chronic gastritis ; posteriorly was a large, ugly old ulcer, about one inch in diameter, mostly or entirely cicatrized : the base of this ulcer was firmly adherent to the pancreas, and its edge was much thickened ; the pyloric orifice lay immediately next to the right and upper edge of the ulcer ; the orifice was widely dilated, and no rupture of mucous membrane existed ; the stretching seemed to have accomplished the object without injury to any adjacent part.

It is not always agreeable to listen to the details of unsuccessful cases ; but, in relation to new procedures, unsuccessful cases possess a certain value, and I have therefore made these two the subject of my paper. The particular points to which I wish to call attention are the cause of death in the first case, and the manner in which stenosis was produced in the second.